

Current Situation of Micronutrient Deficiencies in West Africa

Balla Moussa Diedhiou
Nutrition International

Chowdhury Jalal
Nutrition International

Introduction

Micronutrient deficiency refers to inadequate levels of vitamins and minerals in the human body. It is one of the significant public health issues worldwide. Deficiency of iron, folic acid, iodine, vitamin A and zinc are the most common micronutrient deficiencies, and can lead respectively to anemia, neural tube defects, cognitive impairment, morbidity and mortality.

Iron deficiency and resulting anemia affect more than 3.5 billion people in the developing world and iron deficiency impairs the cognitive development of children, causes productivity and educational losses, and increases morbidity and maternal mortality.¹

Globally, 68% of households in countries with iodine deficiency disorders (IDD) currently consume iodized salt.² By establishing and sustaining national salt iodization schemes and forging effective partnerships between United Nations agencies,



A vitamin A supplement being given to a child under the age of five



Community health worker distributing micronutrients to children under the age of five in Senegal, 2015

national and international nongovernmental organizations and the salt industry, great progress has been made in recent years toward the elimination of iodine deficiency, the most common cause of preventable mental impairment worldwide.

Although severe vitamin A deficiency is declining, subclinical deficiency still affects up to 190 million preschool children.³ Many more school-age children, pregnant women and others are affected. Vitamin A deficiency contributes significantly to raised morbidity and mortality in at-risk populations. Effective, low-cost approaches to the control of vitamin A deficiency are available and are being applied in many countries.⁴

West Africa has a population of close to 372 million people, of whom 62.3 million are children under five years of age. Over one-third of these – 19 million – are stunted. Nearly half of all women of reproductive age (49%) have anemia, and 47% of children aged 6–59 months have vitamin A deficiency.⁵

The existence of a single economic community in the region – the Economic Community of West African States (ECOWAS) – offers opportunities to align regional strategies and policies to tackle malnutrition collectively. This article provides the most updated status of micronutrient deficiencies in West Africa,

TABLE 1: National surveys in West Africa that include data on micronutrient status at population level

| Country | Year of Survey | Survey |
|---------------|----------------|---|
| Benin | 2011–2012 | Benin Demographic and Health Survey |
| Burkina Faso | 2010 | Burkina Faso Demographic and Health Survey – MICS |
| Cape Verde | 2005 | Inquérito Demográfico e de Saúde Reprodutiva (IDSR-II) |
| Cote d'Ivoire | 2011–2012 | Cote d'Ivoire Demographic and Health Survey – MICS |
| The Gambia | 2013 | The Gambia Demographic and Health Survey |
| Ghana | 2017 | Ghana Micronutrient Survey 2017 |
| Guinea | 2012 | Guinea Demographic and Health Survey – MICS |
| Guinea-Bissau | 2012 | Food Fortification Initiative http://ffinetwork.org/country_profiles/ |
| Liberia | 2013 | Liberia Demographic and Health Survey |
| Mali | 2012–2013 | Mali Demographic and Health Survey |
| Niger | 2012 | Niger Demographic and Health Survey – MICS |
| Nigeria | 2013 | Nigeria Demographic and Health Survey |
| Senegal | 2016 | Senegal Continuous Demographic and Health Survey |
| | 2010–2011 | Senegal Demographic and Health Survey – MICS |
| Sierra Leone | 2013 | Sierra Leone Demographic and Health Survey |
| Togo | 2013–2014 | Togo Demographic and Health Survey |

along with actions taken to combat them. Attention is also drawn to the Ghana Micronutrient Survey 2017, which was published in 2018 while the present publication was under development.

“Although severe vitamin A deficiency is declining, subclinical deficiency still affects up to 190 million preschool children”

Methods

The databases available on micronutrient deficiencies were accessed to search for the latest Demographic and Health Surveys (DHS) for each West African country. This information was complemented by the data collected from published and unpublished reports by many international NGOs working in the field of nutrition. We also reviewed other relevant documents that contain information not found in the sources above, such as certain documents from UN agencies (WHO, UNICEF, etc.).

Anemia was used as a proxy for iron deficiency and diarrhea prevalence for zinc deficiency. However, less than 50% of anemia can be attributed to iron deficiency. The categorization of the public health problem presented by the deficiency of each micronutrient was defined according to the following cut-off points in prevalence and range according to international recommendations:

Anemia⁶: no problem $\leq 4.9\%$, mild 5% – 19.9% , moderate 20% – 39.9% , severe $\geq 40\%$

Vitamin A deficiency⁷: no problem $< 2\%$, mild $\geq 2\%$ to $< 10\%$, moderate $\geq 10\%$ to $< 20\%$, and severe $\geq 20\%$

Iodine deficiency: no problem 100 – $200 \mu\text{g/L}$, mild 50 – $99 \mu\text{g/L}$, moderate 20 – $49 \mu\text{g/L}$, severe $< 20 \mu\text{g/L}$

Zinc deficiency⁸: no problem $< 20\%$, problem $> 20\%$

Fifteen DHS and studies conducted between 2000 and 2017 were found (Table 1) that reported data on the nutritional status of iron (anemia), zinc, vitamin A, and iodine in women of reproductive age (Table 2) and children under five years old (Table 3). Some data for Guinea-Bissau were found on the FFI website.

Results

Prevalence of micronutrient deficiencies in West Africa

a. Iron: Anemia, especially due to iron deficiency (IDA), is the most common micronutrient deficiency in the West Africa region, especially among children under five and women of reproductive age. It is estimated that 38%–62% of women of reproductive health in the region suffer from iron deficiency anemia. Only Cape Verde has made progress, with anemia in women of reproductive age being a moderate public health problem. In the 14 remaining countries, anemia in women of reproductive age is a serious public health problem, with all prevalence rates above 40%. The prevalence ranged from 52% to 88% among children under five, and it is a severe public health issue in all West African countries.

Iron supplementation is a relatively inexpensive intervention to treat and prevent anemia related to iron deficiency. For-

TABLE 2: Prevalence of micronutrient deficiencies and magnitude of public health problem in children under five years of age in West African countries, with representative data

| Public health problem | Iron deficiency (prevalence of anemia) | Urinary iodine excretion (median) | Zinc deficiency (prevalence of diarrhea) | Vitamin A deficiency (prevalence of serum retinol <0.70 µmol/L in preschool-age children) |
|-----------------------|--|-----------------------------------|--|---|
| | | Benin* 318 | Sierra Leone 6% | |
| | | Cape Verde* 115 | Benin 6% | |
| | | Cote d'Ivoire* 203 | Mali 7% | |
| | | Liberia** 254 | Nigeria 10% | |
| | | Ghana** 184 | Cape Verde 11% | |
| | | Guinea* 139 | Ghana 12% | |
| No | | Nigeria* 130 | Niger 14% | |
| | | Sierra Leone** 176 | Togo 15% | |
| | | Togo* 171 | Guinea 16% | |
| | | | Burkina Faso 16% | |
| | | | The Gambia 17% | |
| | | | Cote d'Ivoire 18% | |
| | | | Senegal 18% | |
| | | Mali* 69 | Liberia 22% | Cape Verde 2% |
| Mild | | Burkina Faso** 74 | | |
| | | Niger** 82 | | |
| | | Senegal** 80 | | |
| Moderate | | The Gambia 42 | | |
| | Benin 58% | | | Benin 71% |
| | Burkina Faso 88% | | | Burkina Faso 54% |
| | Cape Verde 52% | | | Cote d'Ivoire 57% |
| | Cote d'Ivoire 75% | | | The Gambia 64% |
| | The Gambia 73% | | | Ghana 76% |
| | Ghana 66% | | | Guinea 46% |
| Severe | Guinea 77% | | | Guinea-Bissau 55% |
| | Guinea-Bissau 71% | | | Liberia 53% |
| | Liberia*** 72% | | | Mali 59% |
| | Mali 82% | | | Niger 67% |
| | Niger 73% | | | Nigeria 30% |
| | Nigeria*** 71% | | | Senegal 37% |
| | Senegal 66% | | | Sierra Leone 75% |
| | Sierra Leone 80% | | | Togo 35% |
| | Togo 70% | | | |

* General population data

** Pregnant women data

*** Data collected from WHO, the Global Prevalence of Anemia in 2011

tification with iron could be undertaken with a variety of food vehicles such as processed cereals, rice, salt and infant foods.

b. Iodine deficiency disorders: The prevalence of IDD is less compared to iron deficiency anemia. Iodine deficiency is not a public health issue for most West African countries (Benin, Côte d'Ivoire, Cape Verde, Liberia, Ghana, Guinea, Nigeria, Si-

erra Leone and Togo) and is rather excessive in Benin, Côte d'Ivoire and Liberia. However, the problem is of public health significance in some non-salt-producing countries, where it ranges from mild (Mali, Burkina Faso, Niger and, paradoxically, in Senegal, which produces and exports salt) to moderate (in The Gambia). The urinary iodine concentration ranged from 42 µg/L to 318 µg/L.

TABLE 3: Prevalence of micronutrient deficiencies and magnitude of public health problem in women of reproductive age in West African countries, with representative data

| Public health problem | Iron deficiency (prevalence of anemia) | Prevalence of iodine deficiency (urinary iodine excretion) | Zinc deficiency (prevalence of diarrhea) | Vitamin A deficiency (prevalence of serum retinol <0.70 µmol/L in pregnant women) |
|-----------------------|--|--|--|---|
| No | | No data available | No data available | Nigeria 2% |
| Mild | | | | |
| | Cape Verde 38% | | | Benin 18% |
| | | | | Burkina Faso 17% |
| | | | | Cote d'Ivoire 19% |
| | | | | Ghana 18% |
| | | | | Guinea 19% |
| Moderate | | | | Guinea-Bissau 18% |
| | | | | Liberia 12% |
| | | | | Mali 17% |
| | | | | Niger 15% |
| | | | | Senegal 19% |
| | | | | Sierra Leone 18% |
| | | | | Togo 20% |
| | Benin 41% | | | Cape Verde 21% |
| | Ghana 41% | | | The Gambia 34% |
| | Sierra Leone 42% | | | |
| | Niger 44% | | | |
| | Guinea 45% | | | |
| | Togo 48% | | | |
| Severe | Liberia* 49% | | | |
| | Nigeria* 49% | | | |
| | Mali 50% | | | |
| | Cote d'Ivoire 52% | | | |
| | Senegal 56% | | | |
| | The Gambia 58% | | | |
| | Burkina Faso 62% | | | |
| | Guinea-Bissau 44% | | | |

* Data collected from WHO, the Global Prevalence of Anemia in 2011

The major control methods for IDD are fortification of salt with iodine compounds, and distribution of adequately iodized salt. The cost of iodized salt is about US\$0.05 per person per year.⁹

c. Zinc deficiency: Data on zinc deficiency in the West African countries are scarce and few countries include serum zinc levels as a proxy in their national nutrition surveys. Zinc deficiency is the result of inadequate dietary intake, malabsorption, increased losses, and/or barriers to its utilization. This results in growth retardation, hypogonadism, immune dysfunction and cognitive impairment. However, studies on dietary habits of children under five revealed low dietary intake of zinc ranging from 22% (Liberia) to 6% (Sierra Leone) in countries where data are reported.

d. Vitamin A deficiency: Vitamin A deficiency is also very important in terms of public health implications worldwide. It can lead to a weakened immune system, growth retardation in children, xerophthalmia, an increase in the burden of infectious diseases and an increase in the risk of death. Worldwide, vitamin A deficiency affects 190 million preschool children and 19.1 million pregnant women.⁷

All West African countries have serious vitamin A deficiency for children under five years old. The prevalence of this deficiency varies from 30% (Nigeria) to 75% (Sierra Leone).

National micronutrient delivery platforms

Table 4 describes micronutrient supplementation and fortification programs that are currently implemented at national level



Salt iodization in Ndiemou, Fatick Region, Senegal, with small-scale producers, 2018

in West African countries, and the number of countries that have adopted each of these strategies.

All West African countries (100%) have implemented vitamin A supplementation programs either through routine programming or individual campaigns, while 80% have iron and folic acid supplementation programs and 73% have zinc supplementation programs for diarrhea treatment.

Two-thirds of West African countries (64%) are implementing universal fortification programs. The range varies depending on the micronutrients and food vehicle used. More than three-quarters of the countries (80%) have established salt iodization programs, while almost all (93%) fortified wheat flour with iron and folic acid alone or combined with zinc and B vitamins. Vegetable oil is fortified with vitamin A by 87% of the countries. Maize fortification is, however, very low. Only Côte d'Ivoire and Nigeria fortify maize, although in the absence of any legislation.

“Recent years have witnessed substantial progress in the struggle against micronutrient deficiencies in West Africa, but momentum may be slowing”

Conclusion

Recent years have seen some remarkable achievements and witnessed substantial progress in the struggle against micronutrient deficiencies in West Africa. But there are some signs that the momentum may be slowing as the path steepens. It is now, when micronutrient deficiencies can fairly be said to be a regional issue, that action needs to be taken to put in place the policies and interventions that will sustainably protect the regional population. The challenge is therefore clear and when so much could be achieved for so many and for so little, it would be a global disgrace if micronutrient deficiencies were not brought under control in the years immediately ahead.

Launch of the Zinc Alliance for Child Health (ZACH) for child diarrhea management in Touba Toul, Senegal, February 25, 2013



TABLE 4: National programs that provide micronutrients in West Africa, as reported by countries ($n=15$)

| Program | Target group | No. of countries | Countries (% coverage) |
|---|--------------|------------------|--|
| SUPPLEMENTATION | | | |
| Vitamin A supplementation for children under five | 15 | 15 (100%) | Benin (95%), Burkina Faso (97%), The Gambia (91%), Ghana (100%), Guinea (93%), Guinea-Bissau (100%), Liberia (100%), Mali (80%), Niger (89%), Nigeria (77%), Senegal (85%), Sierra Leone (91%), Togo (77%) |
| Prenatal iron and folic acid supplementation | 15 | 12 (80%) | Benin (28.6%), Burkina Faso (97%), The Gambia (91%), Ghana (100%), Guinea (93%), Liberia (21%), Mali (18.3%), Niger (28.6%), Nigeria (20.5%), Senegal (62.6%), Sierra Leone (30%), Togo (77%) |
| Zinc supplementation for diarrhea treatment | 15 | 11 (73%) | Benin (9.6%), Burkina Faso (0.4%), Cape Verde (21.1%), Guinea (0.5%), Liberia (3.1%), Mali (2.1%), Niger (10.3%), Nigeria (2.3%), Senegal (6.8%), Sierra Leone (3.8%), Togo (0.1%) |
| Universal food fortification | | | |
| Salt (iodine) | 15 | 12 (80%) | Benin (72%), Burkina Faso (22%), The Gambia (8%), Ghana (50%), Guinea (60%), Guinea-Bissau (1%), Mali (74%), Niger (15%), Nigeria (98%), Senegal (16%), Sierra Leone (23%), Togo (67%) |
| Wheat flour | 15 | 14 (93%) | Mandatory for 14 countries except The Gambia, where there is no industrial fortification |
| Vegetable oil | 15 | 13 (87%) | Mandatory for 12 countries, voluntary for Mali, and no industrial fortification in Cape Verde and The Gambia |
| Maize flour | 15 | 2 (13%) | Cote d'Ivoire and Nigeria |

While some new data are presented, there remains a great need for nationally representative data on the prevalence and trends in micronutrient deficiencies in West Africa to inform and improve policy and program decisions.

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Schoolchildren on a school trip to Lac Rose to see the iodization of salt

